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September 27, 2018

Via Electronic Filing

Marlene H. Dortch, Secretary
Federal Communications Commission
445 Twelfth Street, SW
Washington, DC 20554

Re: *Ex Parte* Notice: *Globalstar, Inc. Petition for Notice of Inquiry Regarding the Operation of Outdoor U-NII-1 Devices in the 5 GHz Band* – RM-11808;
Streamlining Licensing Procedures for Small Satellites, IB Docket No. 18-86

Dear Ms. Dortch:

On September 25, 2018, L. Barbee Ponder IV, General Counsel & Vice President, Regulatory Affairs, for Globalstar, Inc. (“Globalstar”), Steve Berman of Lawler, Metzger, Keeney & Logan, LLC, and I met with Umair Javed, Legal Advisor to Commissioner Jessica Rosenworcel, to discuss Globalstar’s May 2018 Petition for Notice of Inquiry regarding the viability of continued spectrum sharing between its licensed mobile satellite service (“MSS”) operations and outdoor Unlicensed National Information Infrastructure (“U-NII”) devices operating in the 5.1 GHz band.¹ On September 26, 2018, Mr. Ponder, Mr. Berman, Dr. Kenneth Zdunek of Roberson and Associates, LLC, and I met and spoke by telephone with Jose Albuquerque and Kal Kautkramer of the International Bureau (“IB”) and Michael Ha, Rashmi Doshi, Ira Keltz, Aspasia Paroutsas, Jamison Prime, and Karen Rackley of the Office of Engineering and Technology (“OET”), to urge the Commission to act on Globalstar’s Petition regarding the rise in the noise floor affecting its end users. On September 27, 2018, this same group of Globalstar representatives met separately with Rachael Bender, Legal Advisor to Chairman Ajit Pai, and Will Adams, Legal Advisor to Commissioner Brendan Carr, regarding the Globalstar Petition.

As described in the Petition, Globalstar has since early 2017 measured a dramatic rise in the noise level in the 5.1 GHz band, where it is licensed for “feeder uplink” transmissions from its gateway earth stations to its satellites.² Globalstar’s real-world data and technical analysis demonstrate that this noise rise is the result of outdoor, higher-power operation of U-NII-1 Wi-Fi

¹ Petition for Notice of Inquiry of Globalstar, Inc., RM-11808 (May 21, 2018) (“Petition”); Public Notice, *Consumer & Governmental Affairs Bureau Reference Information Center Petition for Notice of Inquiry*, Report No. 3092 (rel. June 6, 2018).

² Petition at 10-12.

access points and other devices, permitted by the Commission in April 2014.³ Every Globalstar satellite “hears” all transmissions in its 5096-5250 MHz feeder uplink band across a constantly moving 7,800 kilometer-wide area on the Earth’s surface. Aggregate emissions from U-NII-1 access points within this area radiate in the direction of Globalstar’s satellites, increasing the noise level in its feeder uplink and in turn degrading Globalstar’s MSS to end users in the 2.4 GHz band. After two plus years of deployments, Globalstar is already experiencing a detrimental impact from outdoor U-NII-1 operations, having confirmed a 2 dB increase in the 5.1 GHz noise level since the Commission’s *2014 5 GHz Order*.

Importantly, as described in the Petition, Globalstar has geographically isolated the noise floor rise at 5.1 GHz to North America.⁴ This noise rise is happening only in the vicinity of the United States, where unlimited, higher-power outdoor U-NII-1 deployments have been permitted. Globalstar has conducted extensive measurements showing *no noise increase* over Mexico and Central America, Europe, Australia, or “blue ocean.”

At these meetings, we pointed out that before, during, and after the Commission’s July pleading cycle on the Petition, the opponents to Globalstar’s Petition provided no measurements or other empirical data of their own regarding the noise floor rise at 5.1 GHz, even though many have known about Globalstar’s concerns since at least November 2017.⁵ Nor have these parties identified any other plausible cause of this noise floor rise and resulting interference. As these opponents highlighted in their filings, cable operators and other broadband providers going forward will only increase their reliance on outdoor U-NII-1 operations, making it abundantly clear that the noise floor rise at 5.1 GHz will continue unabated. Globalstar’s uncontroverted evidence of harmful aggregate interference to its Big LEO MSS operations raises concerns similar to aggregate interference issues arising in several other frequency bands where the Commission is considering spectrum sharing between new terrestrial wireless systems and existing satellite operations.⁶

³ *Revision of Part 15 of the Commission’s Rules to Permit Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band*, First Report and Order, 29 FCC Rcd 4127, ¶¶ 34-46 (2014) (“*2014 5 GHz Order*”).

⁴ Petition at 11.

⁵ See Consolidated Reply of Globalstar, Inc., RM-11808, at 8-11 (July 23, 2018).

⁶ Sirius XM Radio, Inc. has described at length its concerns regarding harmful aggregate interference from the potential deployment of unlicensed terrestrial transmitters at 7025-2075 MHz to its sole feeder link spectrum for its licensed satellite digital audio radio service. See Comments of Sirius XM Radio Inc., RM-11808 (July 6, 2018); Letter from Karis Hastings, Counsel for Sirius XM Radio Inc., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 17-183 (June 22, 2018). In addition, in its July 2017 Notice of Inquiry on mid-band spectrum, the Commission noted that, in considering unlicensed use of the 5.925-6.425 GHz band, it would have to consider the potential threat of aggregate harmful interference from large numbers of unlicensed devices to satellite receivers operating in that band. *Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz*, Notice of Inquiry, 32 FCC Rcd 6373, ¶ 29 (2017).

If the Commission does not promptly investigate and explore remedies to the 5.1 GHz noise rise, harmful aggregate interference will seriously degrade Globalstar's MSS offerings – including services provided to the public safety community – in the foreseeable future. Globalstar's products and services are used daily by public safety personnel and other customers around the world for emergency communications, in many instances resulting in life-saving rescues. Globalstar has invested heavily in a second-generation constellation of satellites and ground infrastructure, and it does and will continue to rely heavily upon its two-way communications platforms to keep people connected regardless of the availability of terrestrial networks. Harmful aggregate interference to Globalstar's MSS feeder uplink spectrum at 5.1 GHz will have a substantial, detrimental impact on Globalstar's two-way satellite services.

In our meeting with IB and OET staff, we specifically addressed certain technical issues related to the noise floor rise at 5.1 GHz and the resulting harm to Globalstar's MSS network.⁷ In particular, Dr. Zdunek indicated that Roberson and Associates' technical analysis demonstrating current and future harm to Globalstar's MSS operations assumes that all outdoor U-NII-1 access points are and will be in compliance with the Commission's 2014 requirement limiting the RF energy transmitted by those devices at elevation angles above thirty degrees.⁸ In addition, as also explained in the Petition exhibit on Globalstar's measurement methodology and data, Dr. Zdunek stated that Globalstar's measurement of the 5.1 GHz noise floor at the input of the 2.4 GHz amplifiers of its satellites' transponders provides valid and accurate results, given the strictly linear "dB/dB" response in gain across these satellites, shown in the Petition, and the necessity of linearity due to the CDMA nature of Globalstar's MSS network.⁹

Thus, with the closing of the pleading cycle on Globalstar's Petition and opponents' utter failure to provide contrary evidence, the Commission should expeditiously issue a Notice of Inquiry that investigates the noise floor rise at 5.1 GHz and creates the detailed record necessary for a long-term solution to this harmful interference. The Commission has a statutory obligation to protect licensed services, and it committed in its 2014 order to take "corrective action" in

Meanwhile, in its Spectrum Frontiers rulemaking proceeding, the Commission in 2017 established a docket to collect further information regarding the potential impact of terrestrial wireless device deployment on satellite networks in the 28 GHz band. Public Notice, *Docket Established for 28 GHz Aggregate Interference Analysis*, Public Notice, GN Docket No. 17-171 (rel. June 21, 2017). *See also* Comments of the Satellite Industry Association, RM-11808 (July 6, 2018).

⁷ At these meetings, we provided Ms. Bender, Mr. Adams, and OET and IB staff with copies of the slide presentation attached to this *ex parte* notice.

⁸ *See 2014 5 GHz Order* ¶ 36; 47 C.F.R. § 15.407(a)(1)(i).

⁹ *Globalstar 5 GHz Noise Floor Measurement Description and Current Results*, at 7, 12 (May 21, 2018), attached as Appendix A to Petition, at 7, 12. *ar* Measurement Report.

response to any harmful interference to Globalstar MSS.¹⁰ The Commission should open a proceeding on these crucial interference issues rather than look the other way and do nothing.

Finally, at our meeting with Mr. Javed, we also addressed issues that Globalstar raised in its recent comments and reply comments on the Commission's Notice of Proposed Rulemaking regarding streamlined licensing procedures for small satellite systems.¹¹ Globalstar has a strong interest in improved rules for small satellite operations, as numerous small satellite operators have in recent years sought experimental authority for communications with Globalstar's MSS constellation to enable indirect data communications between their small spacecraft and ground networks. Globalstar generally supports the Commission's proposal for streamlined licensing for small satellite systems. Neither the Commission's existing Part 25 licensing procedures nor its experimental licensing framework is an appropriate mechanism for authorizing small-satellite operations.

As we explained at this meeting, to fully accommodate small satellite use of Globalstar's MSS network, the Commission should pursue certain necessary changes to the domestic and international MSS allocations in the Big LEO bands. The Commission should not promote this use of Globalstar's network, on the other hand, by adding a new, separate domestic allocation for inter-satellite links in the Big LEO bands, since such allocations could result in extensive inter-satellite transmissions between non-Globalstar satellites and cause harmful interference to Globalstar MSS. In addition, the Commission should not permit standalone small satellite operations in Globalstar's licensed MSS spectrum at 1610.6-1613.8 MHz, because such standalone operations would create an unreasonable threat of harmful interference to Globalstar's co-channel MSS operations.

¹⁰ 47 U.S.C. § 301; *2014 5 GHz Order* ¶ 38. In its 2014 order, the Commission recognized that Globalstar's licensed MSS is protected against harmful interference from unlicensed operations and acknowledged Globalstar's technical ability to measure the noise level at its satellite antennas. *Id.* ¶¶ 38, 46.

¹¹ *Streamlining Licensing Procedures for Small Satellites*, Notice of Proposed Rulemaking, IB Docket No. 18-86 (rel. Apr. 17, 2018). *See also* Comments of Globalstar, Inc., IB Docket No. 18-86 (July 9, 2018); Reply Comments of Globalstar, Inc., IB Docket No. 18-86 (Aug. 7, 2018).

Pursuant to section 1.1206(b)(2) of the Commission's rules, 47 C.F.R. § 1.1206(b)(2), this *ex parte* notification and the attached slide presentation are being filed electronically for inclusion in the public record of the above-referenced proceedings.

Respectfully submitted,

/s/ Regina M. Keeney
Regina M. Keeney

cc: Rachael Bender
Will Adams
Umair Javed
Jose Albuquerque
Michael Ha
Rashmi Doshi
Kal Kautkramer
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Aspasia Paroutsas
Jamison Prime
Karen Rackley

Globalstar Petition for NOI

Prepared for Globalstar, Inc. by
Roberson and Associates, LLC
26,27-Sep-2018



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Technology and Management Consultants[®]

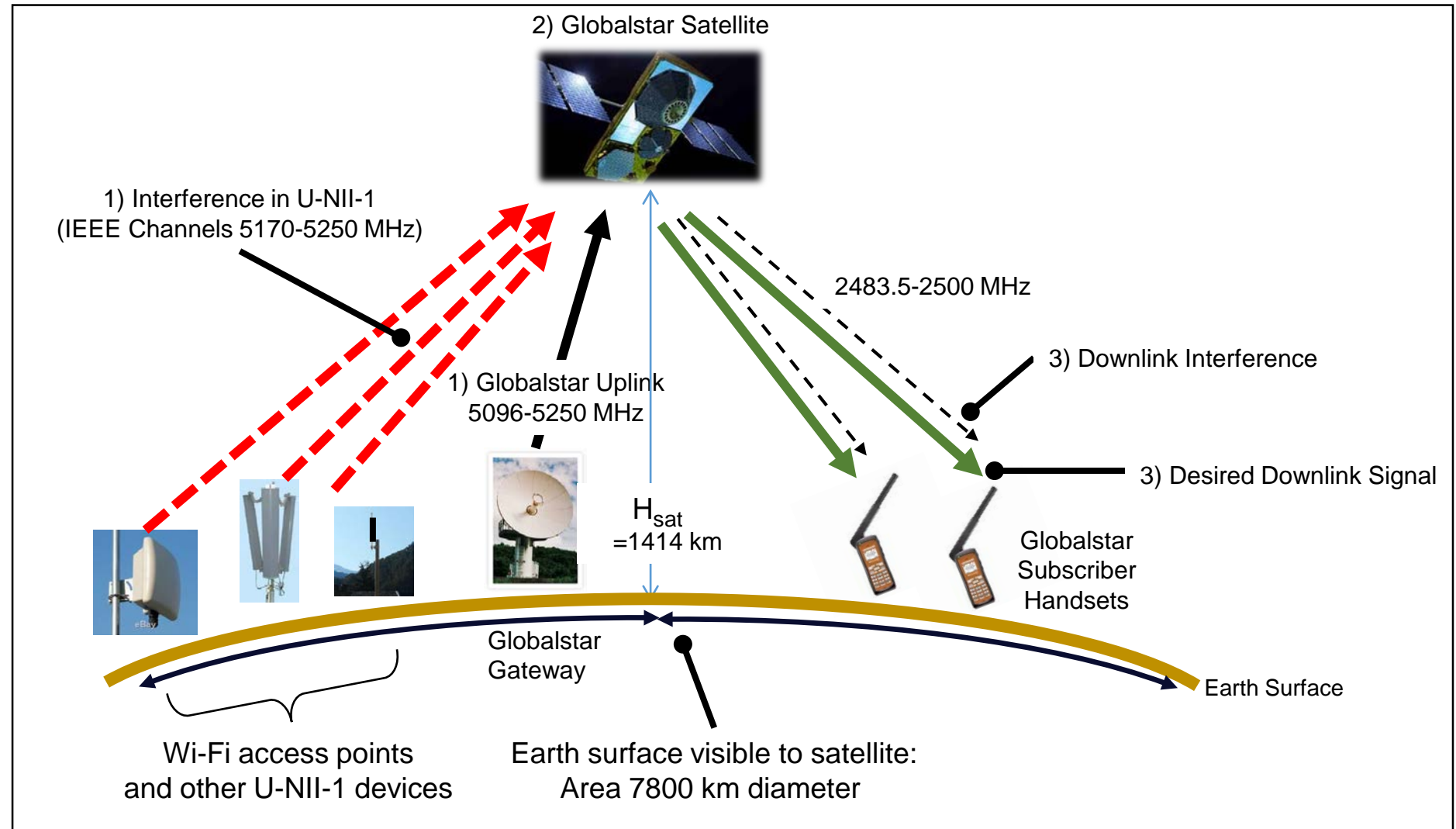
Globalstar's Petition for NOI on 5 GHz U-NII-1 Issues: A Response to Threat of Increased Degradation to Globalstar Satellite Services

- In 2014, the FCC adopted rules allowing outdoor operation of higher power Wi-Fi access points and other devices in the U-NII-1 band (5150-5250 MHz) for the first time
- Since April 2014, Globalstar has measured the noise floor on eight satellites as they traverse the United States, North America, and the globe: over 800 measurements have been made.
 - Currently, and only over the US, six of eight satellites are measuring a 2 dB rise (with the other two measuring a 1 dB rise)
 - A 2 dB noise rise causes ~6% network capacity reduction (fewer users) in > 50% of Globalstar's service area
- If the noise rise increases at projected rates based on anticipated Wi-Fi growth, by 2022:
 - Globalstar capacity (number of active users) could be reduced by as much as 35% in > 50% of the service area
 - Satellite users will experience degraded service: an increase in dropped calls and failed call attempts, and a reduced geographic service area

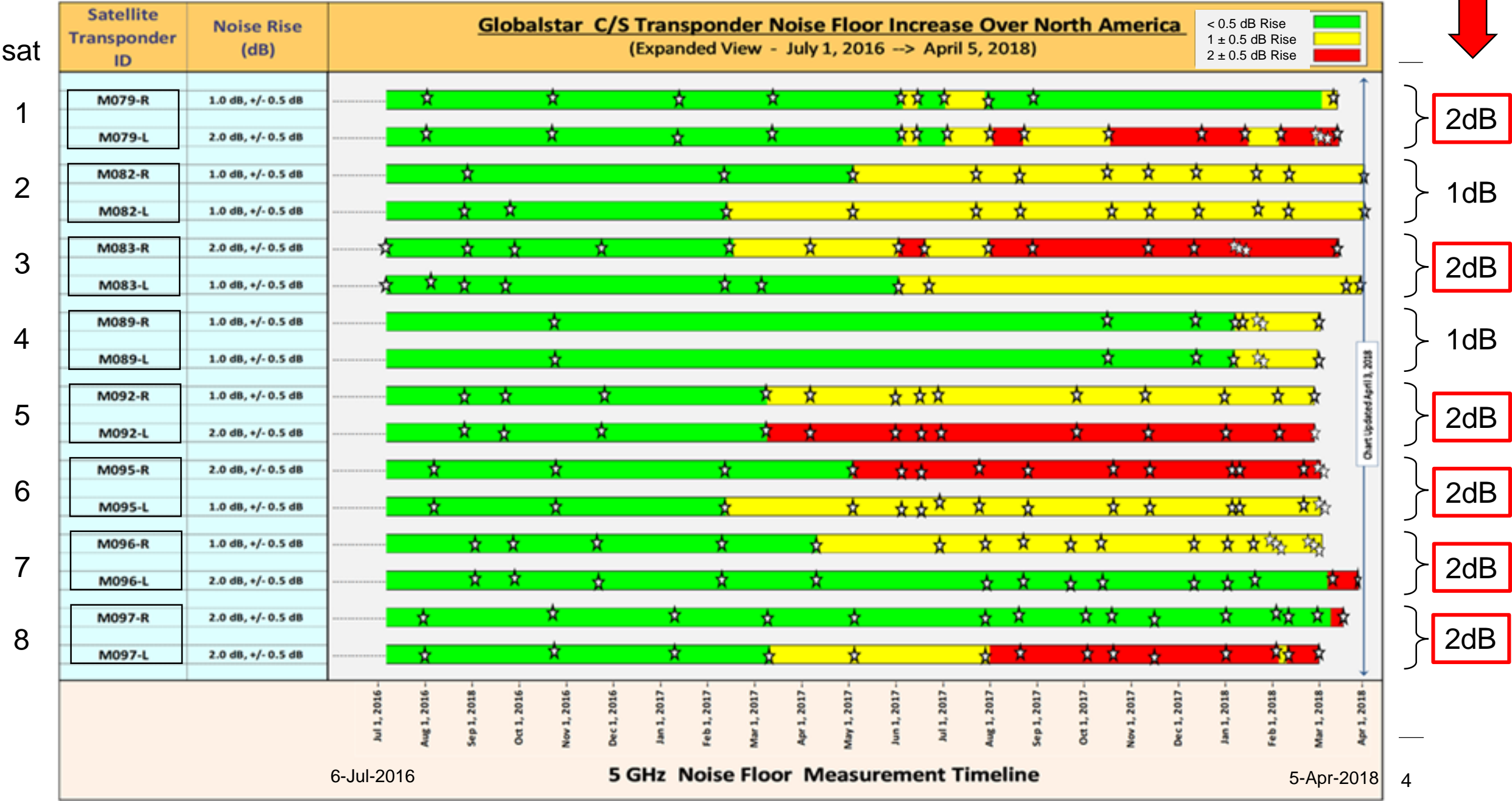
Interference to Globalstar MSS Is Caused by U-NII-1 Access Points

- Opponents of NOI Have Suggested No Other Source

- 1) Aggregate interference from outdoor devices in U-NII-1 (5150-5250 MHz) degrades the Globalstar MSS feeder uplink in 5096-5250 MHz
- 2) Globalstar satellite is an RF transponder - acts as a "bent pipe"
- 3) Uplink interference at 5 GHz in turn degrades the satellite-to-handset user downlink

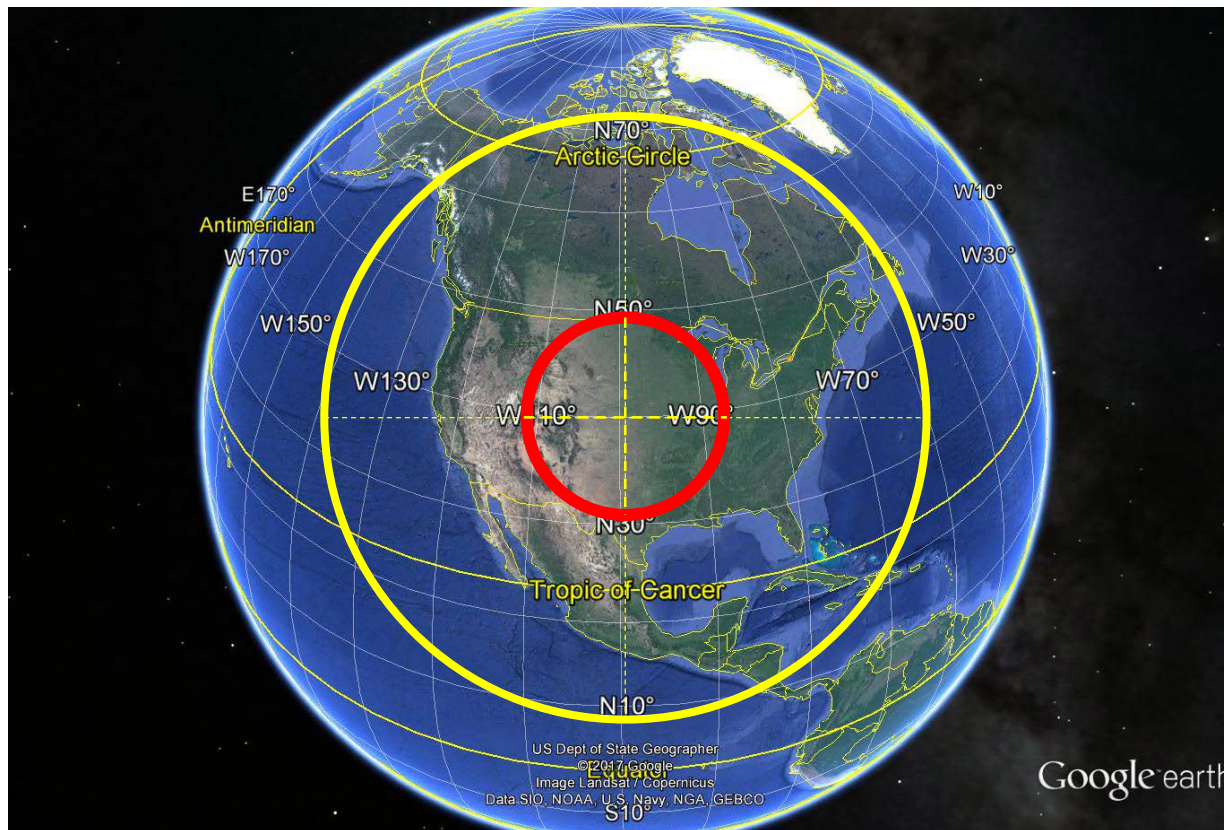


6 of 8 Satellites Measured Are Exhibiting a 2 ±0.5 dB Noise Rise



U-NII-1 Transmitters Throughout a 7800 km Diameter Area Generate Aggregate Interference to Globalstar

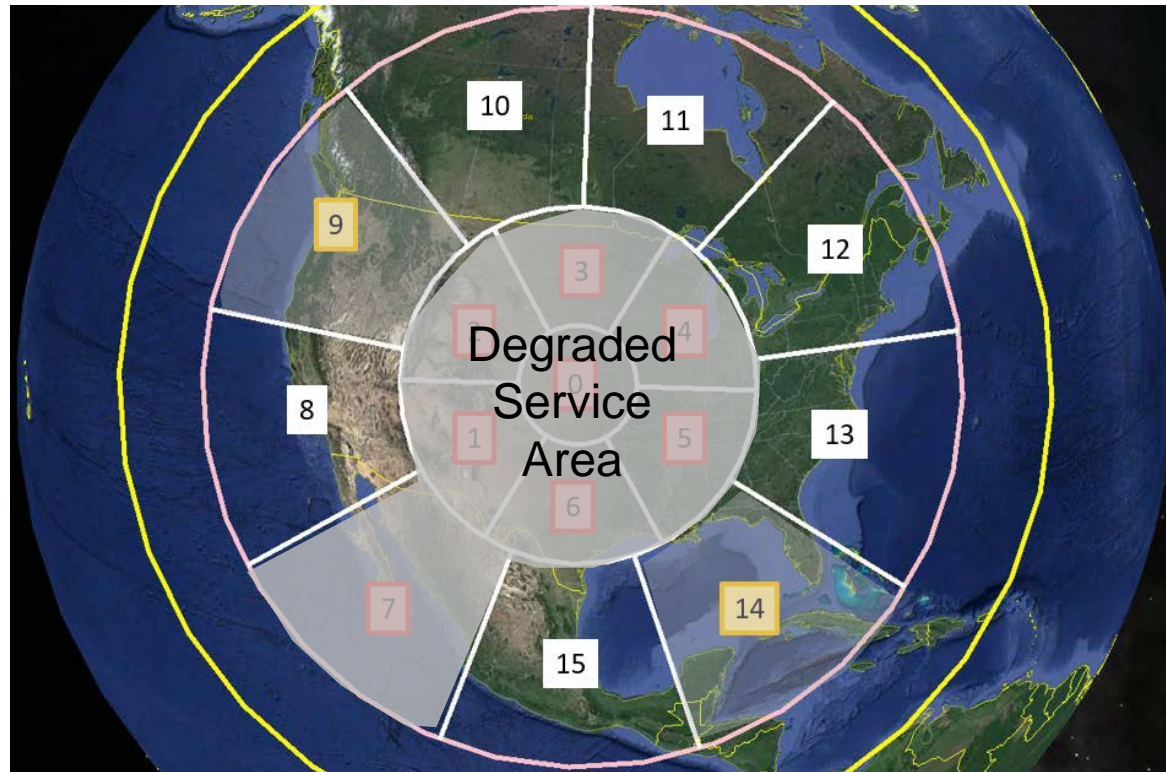
- Globalstar satellites provide continuous coverage over U.S.: about 15 minutes from horizon-to-horizon
- A satellite traveling within the red circle receives interference from all outdoor U-NII-1 devices in the yellow circle
- The area within the yellow circle includes all of North America except for Alaska.



Yellow Circle:
- 7800 km diameter
- area with view to Globalstar satellites

A Substantial Portion of the Globalstar MSS Service Area is Degraded by U-NII-1 Interference

- All Service in Shade Spot Beams 0-7 is Degraded by Wi-Fi Interference Occurring on the Satellite Uplink
- Service in Beams 9 and 14 Can Be Degraded in Future by LTE-LAA (unlicensed LTE)



- At any instant as the satellite footprint traverses the U.S., a significant area is degraded by U-NII-1 interference
- Successive satellites passing over the U.S. experience the same degradation
- At times, service degradation extends beyond borders of United States and into Canada and Mexico

Noise Floor and Degradation Will Increase Unabated with AP Growth

Projected Growth
Based on NCTA
Filings at FCC

Date	Total Number of Reported NCTA Access Points
Oct '16	16 M ¹
Jun '17	19.7 M ²

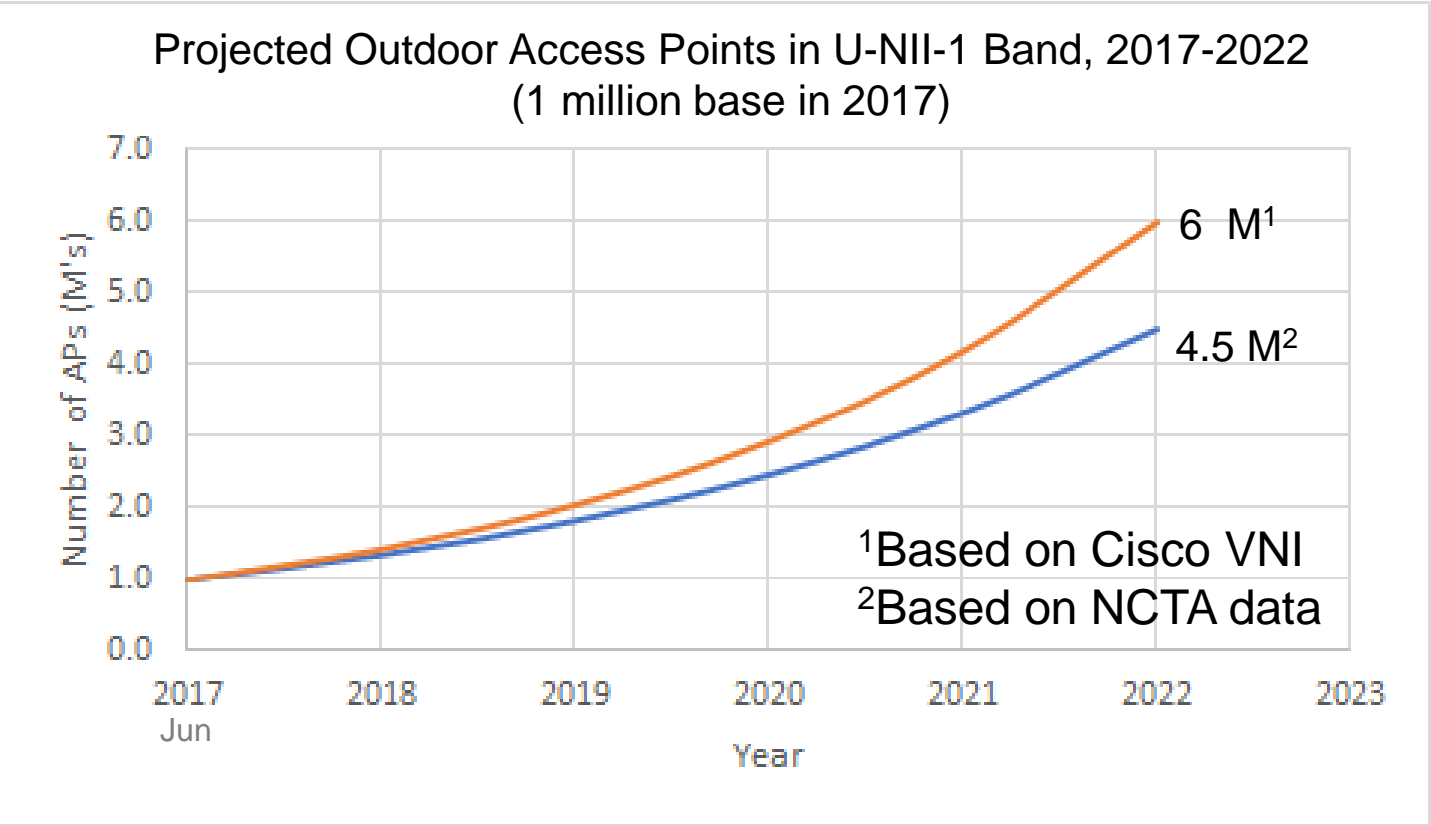
Projected Growth
from Cisco VNI 2017

“Six-fold increase in public Wi-Fi APs”

- These are growth rates of 35% and 43% per year, respectively

Conclusion:

- At these rates, the number of outdoor access points in U-NII-1 could increase to between 4.5 and 6 million by 2022



¹ Ex Parte filing of NCTA, Oct. 12, 2016

² Comments of NCTA – The Internet & Television Association (Jun. 2017)

Globalstar Network Capacity (Number of Active Users Able to be Supported) Is Being Degraded Now in Beams 0-7

- Serious Degradation Will Occur as the Number of APs and Their Utilization Increases

